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EXAMINER

HUNG, YUBIN

ART UNIT PAPER NUMBER

2625

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/080,630	<b>Applicant(s)</b> NOMURA, SHOUICHI	
	<b>Examiner</b> Yubin Hung	<b>Art Unit</b> 2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19 and 20 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-18 and 21-23 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Oath/Declaration***

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:  
It does not identify the city and either state or foreign country of residence of each inventor. The residence information may be provided on either on an application data sheet or supplemental oath or declaration.

### ***Drawings***

2. The drawings are objected to because
  - Per p. 46, lines 16-20, "LUTB" in Fig. (a) should have been "LUTA" and, similarly, "LUTA" in Fig. 11 (b) should have been "LUTB"
  - Similar error exists in Fig. 12 (c)

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be

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canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities:
- P. 40, line 6: the letters "β" and "β'" are missing
  - P. 45, 3<sup>rd</sup> line from bottom: "Fig. 10" should have been "Fig. 11"
  - P. 47, line 5: "Fig. 11" should have been "Fig. 10"
  - P. 47, 2<sup>nd</sup> line from bottom: "Fig. 10" should have been "Fig. 11." (Consider re-label Figs. 10 and 11)
  - Claim 2, line 3: "different each other" should have been "different from each other"

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4, 16, 17 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically:

- Claim 4, line 8: it is not clear what the phrase “corresponding to ...” qualifies.  
(The spatial-filtering processing or the data value?). **For examination purpose, the spatial-filtering processing is assumed**
- Claim 16, lines 2-3: not clear what the phrase “each of ... three dimensions” qualifies since it is customary in the art to consider each color component as one dimension. Claims 17 and 23 are similarly rejected due to dependency.  
**For examination purpose, the phrase is interpreted as qualifying the preceding “source image data”**

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Ward et al.  
(US 5,585,859).

Regarding claim 1, Ward discloses

- setting a predetermined upper-limit value for variation amount of said source image data, before performing an image-conversion processing through which said source image data are converted to said processed image data by applying said spatial-filtering processing  
[Col. 4, lines 55-61. Note that  $V_{(t)}$  is the pre-determined upper limit and the variation amount is  $V_{(max)} - V_{(min)}$ ]
- performing said image-conversion processing for said source image data within a range of said variation amount limited by said predetermined upper-limit value  
[Col. 4, lines 58-61. Note that replacing the value of pixel (i,j) by a weighted average is a spatial filtering process]

8. Claim 5 is rejected under 35 U.S.C. 102(e) as being anticipated by Zhang et al.  
(US 6,765,587).

9. Regarding claim 5, Zhang discloses

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- applying a plurality of spatial-interpolation processing methods, being different relative to each other, to said source image data, while each of said plurality of spatial-interpolation processing methods is corresponding to each of said plurality of color components  
[Fig 3, refs 33 & 34; Col. 8, lines 18-22 (multiple colors); Col. 11, lines 31-35 (different interpolating methods)]

10. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Kido et al.

(US 5,561,724).

Regarding claim 10, Kido discloses

- extracting a plurality of couples of pixels, in each of which two pixels are symmetrically positioned in respect to an objective pixel to be processed through an image processing  
[Fig. 1, ref. 101; Fig. 2; Col. 3, lines 55-62]
- calculating differential values between said two pixels and said objective pixel with respect to said plurality couples of pixels  
[Fig. 1, ref. 101; Fig. 2; Col. 4, lines 3-21]
- extracting a specific couple of pixels, having a minimum differential value, out of said plurality of couples of pixels  
[Fig. 1, ref. 102; Col. 4, lines 22-25]
- setting a weighted-addition average value of three pixels including said specific couple of pixels and said objective pixel concerned, as a new objective pixel  
[Fig. 1, ref. 103; Figs. 2 & 3; Col. 4, line 35-51]

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 2 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ward et al. (US 5,585,859) as applied to claim 1 above, and further in view of Peli (US 6,611,618).

13. Regarding claim 2, Ward discloses all limitations of its parent, claim 1.

Ward does not expressly disclose

- a plurality of spatial-filtering processing(s), characteristics of which are different each other, are performed either simultaneously in parallel or sequentially one by one in said image-conversion processing, and said predetermined upper-limit value is set for every spatial-filtering processing, corresponding to each of said characteristics of them

However, Peli discloses an image-processing method that performs multiple, different spatial filtering processes. [Fig. 11; Col. 11, lines 6-26. Note that per the analysis of claim 1, Ward teaches/suggests setting predetermined upper limit to each of the spatial filtering processes.]

Ward and Peli are combinable because they both have aspects that from the same field of endeavor of spatial filtering.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Ward with the teaching of Peli by using multiple spatial filtering processes.



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The motivation would have been to be able to detect multiple features, as pointed out by Peli in Col. 10, lines 54-56]

Therefore, it would have been obvious to combine Peli with Ward to obtain the invention as specified in claim 2.

14. Regarding claim 18, Peli further discloses in Fig. 14 an image processing apparatus with an input section [ref. 70], an image-processing section [ref. 76: note that the processor is inherently capable of executing instructions to perform the method specified in claim 2] and an output section [refs. 72 & 76: note that it is obvious, and widely practiced, to have a processor to have a storage medium (e.g. a hard drive), be connected to a printer (for producing hard copies) and a display monitor, and to support selective output to any of such devices; even a low-end home PC has such a configuration and capability].

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15. Claims 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ward et al. (US 5,585,859) and Peli (US 6,611,618) as applied to claim 2 above, and further in view of Cremonesi et al. (US 5,196,935).

16. Regarding claim 4, the combined invention of Ward and Peli discloses all limitations of its parent, claim 2.

The combined invention of Ward and Peli does not expressly disclose

- a plurality of spatial-filtering processing(s), characteristics of which are different each other, are performed either simultaneously in parallel or sequentially one by one in said image-conversion processing, and said predetermined upper-limit value is set for every spatial-filtering processing, corresponding to each of said characteristics of them

However, Cremonesi discloses a noise-reducing method that computes a difference amount for a pixel and replace the pixel value (i.e., applying a spatial filtering) if the difference is greater than a predetermined threshold. [Fig. 1, ref. 6; Figs. 3 & 4; Col. 5, lines 31-44. Note that it is obvious that the comparison is made with the magnitude of the difference, i.e., its absolute value, because the point is to determine whether a pixel value is noise or not, as one of ordinary skill in the art at the time of the invention would have known.]

The combined invention of Ward and Peli is combinable with Cremonesi because they both have aspects that from the same field of endeavor of spatial filtering.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Ward and Peli with the teaching of Cremonesi by applying spatial filtering if the variation amount is greater than a predetermined threshold value. The motivation would have been to be able to reduce noise, as pointed out by Cremonesi in Col. 1, lines 61-63.

Therefore, it would have been obvious to combine Cremonesi with Ward and Peli to obtain the invention as specified in claim 4.

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17. Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 6,765,587) as applied to claim 5 above, and further in view of Hieda et al. (US 6,631,216).

18. Regarding claim 6, Zhang discloses all limitations of its parent, claim 5.

Zhang does not expressly disclose

- one of said spatial-interpolation processing methods, being different in response to a magnification factor of either said enlargement or said reduction processing, is employed for processing at least one said color components

However, Hieda discloses an image interpolation apparatus that is responsive to a zooming (i.e., magnification) factor. [Fig. 12A, refs. 209, 210 & 221-223; Fig. 12B: refs. 213, 214, 217 & 218; Col. 11, lines 15-33.]

Zhang is combinable with Hieda because they both have aspects that from the same field of endeavor of spatial interpolation.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Zhang with the teaching of Hieda by having the interpolator be responsive to a

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zooming (i.e., magnification) factor. The motivation would have been to adapt the interpolation to the desired magnification factor by changing the coefficient values so as to obtain better results.

Therefore, it would have been obvious to combine Hieda with Zhang to obtain the invention as specified in claim 6.

19. Regarding claim 8, Zhang and Hieda further discloses

- wherein one of said color components includes data sets of at least three dimensions, one of which represents brightness information, and another two of which represent chrominance coded information, and with respect to a dimension representing said brightness information, a spatial-interpolation processing method, being different from that employed for said chrominance coded information, is applied [Zhang: Fig 3, refs 33 & 34; Col. 8, lines 18-22 (multiple colors); Col. 11, lines 31-35 (different interpolating methods)]
- said spatial-interpolation processing method is further changed in response to said magnification factor [Hieda: Fig. 12B, refs. 217 or 218 (using different coefficients in response to the magnification factor). Note that changing coefficients results in a changed interpolation processing]

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20. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 6,765,587) and Hieda et al. (US 6,631,216) as applied to claims 6 and 8 above, and further in view of Mahmoodi (US 5,774,601).

21. Regarding claim 7, the combined invention of Zhang and Hieda discloses all limitations of its parent, claim 6. In addition, Zhang also discloses

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- Said spatial-interpolation processing methods are performed by employing weighted-addition average values of a plurality of pixels [Col. 9, line 63-Col. 190, line 5. Note that it is well known in the art that cubic convolution interpolation is a form of weighted averaging]

and Hieda further discloses

- wherein a weighted averaging operation in respect to said look-up tables is further performed in response to said magnification factor of either said enlargement or said reduction processing, in order to create new **weighting coefficients** for spatial-interpolation processing(s) [Fig. 12B, refs. 217 or 218 (using different coefficients in response to the magnification factor); Fig. 12A, refs. 209, 210 & 221-223 (creating new weighting coefficients for spatial-interpolation processing in response to magnification factor)]

The combined invention of Zhang and Hieda does not expressly disclose

- look-up tables (LUTS) weighting coefficients, corresponding to said plurality of spatial-interpolation processing methods, are provided

However, Mahmoodi teaches/suggests the use of lookup tables for the interpolation coefficients [Fig. 1, ref. 18; Col. 6, lines 55-59].

The combined invention of Zhang and Hieda is combinable with Mahmoodi because they both have aspects that from the same field of endeavor of spatial interpolation.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Zhang and Hieda with the teaching of Mahmoodi by using a lookup tables for the interpolation coefficients. The motivation would have been to provide an efficient way to access the interpolation coefficients since only memory access, not arithmetic operations, is required.

Therefore, it would have been obvious to combine Mahmoodi with Zhang and Hieda to obtain the invention as specified in claim 7.

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22. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen (US 6,792,128) in view of Ishikawa et al. (US 5,838,833).

23. Regarding claim 9, Nguyen discloses

- performing a size-varying processing to vary a size of an image up in advance and an angle-rotating processing to rotate an angle of said image up to a first angle value, being a predetermined rotating angle [Col. 15, lines 4-10]
- performing again said size-varying processing to further vary said size of said image up to an objective size also established in advance and said angle-rotating processing to reversely rotate said angle of said image up to a second angle value, being opposite said first angle value [Col. 15, lines 22-27]

Nguyen does not expressly disclose

- applying said spatial-filtering processing to image processed by said size-varying processing and said angle-rotating processing

However, Ishikawa teaches/suggests smoothing (a kind of spatial filtering) an image after it is reduced and rotated. [Fig. 5, refs. 44 and 47.]

Nguyen and Ishikawa are combinable because they both have aspects that from the same field of endeavor of image rotation and spatial filtering.

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At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Nguyen with the teaching of Ishikawa by smoothing an image after it is reduced and rotated. The motivation would have been to remove artifacts and noise resulted from size changing and rotation so that they won't be amplified by the subsequent size-varying and rotation operations (specified in Nguyen).

Therefore, it would have been obvious to combine Ishikawa with Nguyen to obtain the invention as specified in claim 9.

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24. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al. (US 5,561,724) as applied to claim 10 above, and further in view of Ward et al. (US 5,585,859).

Regarding claim 11, Kido discloses all limitations of its parent, claim 10.

Kido does not expressly disclose

- wherein, only when said minimum differential value is lower than a first threshold value established in advance, a weighted-addition averaging processing is performed with respect to said specific couple of pixels

However, Ward teaches/suggests performing a weighted averaging only if a selected differential value does not exceed a predetermined threshold. [Col. 4, lines 58-61].

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Kido is combinable with Ward because they both have aspects that from the same field of endeavor of spatial interpolation.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Kido with the teaching of Ward by performing a weighted averaging only if a selected differential value does not exceed a predetermined threshold. The motivation would have been to better preserve features such as edges since it is well known in the art that a large differential value can indicate such fine features.

Therefore, it would have been obvious to combine Ward with Kido to obtain the invention as specified in claim 11.

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25. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al. (US 5,561,724) and Ward et al. (US 5,585,859) as applied to claim 11 above, and further in view of Scheib et al. (US 5,628,321).

Regarding claim 12, the combined invention of Kido and Ward discloses all limitations of its parent, claim 11, and, per the analysis of claim 11, the following:

- extracting all of specific couples of pixels, differential values of which are lower than said new threshold value, out of and said plurality of couples of pixels;
- setting an average value of image data, included in said specific couples of pixels, as a value of a noticed pixel



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The combined invention of Kido and Ward does not expressly disclose

- establishing a new threshold value, which is obtained by adding a predetermined differential value positive value to said minimum

However, Scheib teaches/suggests establishing a new threshold value by adding a predetermined differential value positive value to said minimum. [Fig. 5A, refs. 510, 512.]

The combined invention of Kido and Ward is combinable with Scheib because they both have aspects that from the same field of endeavor of thresholding.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Kido and Ward with the teaching of Scheib by establishing a new threshold value by adding a predetermined differential value positive value to said minimum. The motivation would have been to include more pixels in the averaging to guard against the possibility that the ones satisfying the minimum differential happens to be outliers, the results of added noise.

Therefore, it would have been obvious to combine Scheib with Kido and Ward to obtain the invention as specified in claim 12.

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26. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kido et al. (US 5,561,724) and Ward et al. (US 5,585,859) as applied to claim 11 above, and further in view of Iu (US 5,361,105).

Regarding claim 13, the combined invention of Kido and Ward discloses all limitations of its parent, claim 11, and, per the analysis of claim 11, the following:

- applying a noise-filtering processing and smoothen all image signals, being lower than said second threshold value

The combined invention of Kido and Ward does not expressly disclose

- establishing a second threshold value, being lower than said first threshold value established in advance

However, Iu teaches/suggests establishing a new threshold value that is lower than a predetermined threshold. [Col. 13, lines 56-59.]

The combined invention of Kido and Ward is combinable with Iu because they both have aspects that from the same field of endeavor of thresholding.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Kido and Ward with the teaching of Iu by establishing a new threshold value that is lower than a predetermined threshold. The motivation would have been to obtain a better noise reduction result.

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Therefore, it would have been obvious to combine lu with Kido and Ward to obtain the invention as specified in claim 13.

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27. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bilt et al. (US 5,526,119), in view of Ward et al. (US 5,585,859) and lu (US 5,361,105).

**(Examiner's comment:** It appears that the second application of the smoothening operation is meant to be on the basis of the second threshold value and the larger radius. However, this is not expressly indicated in the claim. The examination of this claim is based on the assumption that the new threshold and radius are used.)

28. Regarding claim 14, the Bilt discloses:

- applying a signal-smoothening processing to said source image data to generate second source image data; and setting a radius, which is larger than said maximum radius, and applying again said signal-smoothening processing to said second source image data  
[Fig. 24, ref. 1852; Col. 30, lines 2-15. Note that both annular filters perform a kind of smoothing]

Bilt does not expressly disclose

- setting a first threshold value predetermined in advance and a maximum radius from a noticed pixel, to be processed by an image-processing, to an objective pixel, being an object for comparison, with respect to said source image data and
- *(applying the signal-smoothening processing)* on the basis of said first threshold value and a differential value between said noticed pixel and said objective pixel
- setting a second threshold value, which is smaller than said first threshold value

However, Ward teaches/suggests applying a weighted averaging (a kind of smoothing) operation to pixels with a corresponding differential value less than a predetermined threshold [per the analysis of claim 1; note that the pixel with the maximal intensity is considered the noticed pixel and the one with the minimal intensity is the objective pixel] and lu teaches/suggests establishing a new threshold value that is lower than a predetermined threshold. [Col. 13, lines 56-59.]

Bilt is combinable with Ward and lu because they both have aspects that from the same field of endeavor of signal filtering.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Bilt with the teaching of Ward and lu by predetermining a threshold to compare with a differential value before applying a smoothing operation and then establishing a new threshold value that is lower than a predetermined threshold for another smoothing operation. The motivation would have been to better preserve features such as edges since it is well known in the art that a large differential value can indicate such fine features while removing noises of different sizes.

Therefore, it would have been obvious to combine Ward and lu with Bilt to obtain the invention as specified in claim 14.

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29. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bilt et al. (US 5,526,119), Ward et al. (US 5,585,859) and lu (US 5,361,105) as applied to claim 14, and further in view of Levantovsky (US 6,614,944).

30. Regarding claim 15, the combined invention of Bilt, Ward and lu discloses all limitations of its parent, claim 14. Ward further discloses

- wherein said source image data are obtained by applying a gradation-converting processing to image data outputted by an image inputting apparatus  
[Fig. 1, ref. 12; Col. 4, lines 49-52. Note that the converted signals are intensity, i.e., gradation, values]

The combined invention of Bilt, ward and lu does not expressly disclose

- said first threshold value and/or said second threshold value are/is found on the basis of gradation-conversion characteristics in the vicinity of a signal value of said noticed pixel to be processed by said image-processing

However, Levantovsky teaches/suggests determining threshold values on the basis of gradation-conversion characteristics in the vicinity of a signal value of said noticed pixel.  
[Fig. 5, ref. 108; Col. 4, lines 15-17.]

The combined invention of Bilt, Ward and lu is combinable with Levantovsky because they both have aspects that from the same field of endeavor of thresholding.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Bilt, Ward and lu with the teaching of Levantovsky by determining threshold values on the basis of gradation-conversion characteristics in

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the vicinity of a signal value of said noticed pixel. The motivation would have been to make the smoothening decision adaptive to local characteristics which can produce better result in situations when the noise distribution is not uniform.

Therefore, it would have been obvious to combine Levantovsky with Bilt, Ward and lu to obtain the invention as specified in claim 15.

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31. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Geiger et al. (US 5,268,751), and in view of Ukita (JP 63-178674, with English abstract).

Regarding claim 16, Geiger discloses

- applying a second spatial-filtering processing to all of said data sets [Fig. 7a, ref. 721; Col. 4, line 39-41]
- wherein a power for emphasizing a low-spatial frequency region in said second spatial-filtering processing is greater than that in said first spatial-filtering processing [Fig. 7a, ref. 721. Note that a low-pass filter (i.e., the second filter) emphasizes more on the low-frequency region]

Geiger does not expressly disclose

- Applying a first spatial-filtering processing to a data set representing said brightness information

However, Ukita teaches/suggests applying a high-pass filter (i.e., the first spatial-filtering) to the luminance (i.e., brightness) component. [English abstract, constitution, lines 1-8; Fig. 1, ref. 31.]

Geiger and Ukita are combinable because they have aspects that are from the same field of endeavor of signal filtering.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Geiger with the teaching of Ukita by applying a high-pass filter to the brightness component. The motivation would have been to be able to detect high-frequency features such as edges so as to support auto-focusing as Ukita indicates in the abstract.

Therefore, it would have been obvious to combine Ukita with Geiger to obtain the invention as specified in claim 16.

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32. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Geiger et al. (US 5,268,751) and Ukita (JP 63-178674, with English abstract) as applied to claim 16, and further in view of Sugihara et al. (US 5,523,802).

Regarding claim 17, the combined invention of Geiger and Ukita discloses all limitations of its parent, claim 16.

The combined invention of Geiger and Ukita does not expressly disclose

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- performing a color coordinate-converting processing by which said brightness information and said chrominance coded information are converted to each of color component signals, after applying said first spatial-filtering processing and before applying said second spatial-filtering processing

However, Sugihara teaches/suggests converting the luminance (i.e., brightness information) and chrominance information into the R, G and B color components and then applying the low-pass (i.e., the second) spatial-filtering process. [Fig. 7, refs. 1, 2, 3, 4r, 4g, 4b. See also Col. 1, lines 11-36 for the description of identical elements shown in Fig. 1. Note that the high-pass filtering taught by Ukita is applied to the luminance component and therefore before the color conversion.]

The combined invention of Geiger and Ukita is combinable with Sugihara because they have aspects that are from the same field of endeavor of signal filtering.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Geiger and Ukita with the teaching of Sugihara by converting the luminance (i.e., brightness information) and chrominance information into the R, G and B color components and then applying the low-pass (i.e., the second) spatial-filtering process. The motivation would have been to represent the image in a widely used format that is ready for display (say, on a CRT) and also to remove noise from the converted image, as a low-pass filter such as a Gaussian is well known to be capable of.



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Therefore, it would have been obvious to combine Sugihara with Geiger and Ukita to obtain the invention as specified in claim 17.

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33. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6,594,400), and in view of Kahara (JP 63-285,669, with English abstract).

34. Regarding claim 21, Kim discloses

- extracting specific pixel values, whose differential values are lower than a predetermined threshold value, in respect to noticed pixels, and applying a weighted-addition averaging processing to said specific pixel values  
[Fig. 1, ref. 105; Col. 4, lines 14-19; Col. 6, lines 23-28]
- applying an averaging processing to residual pixel values  
[Fig. 1, ref. 105; Col. 4, lines 14-19]

Kim does not expressly disclose

- extracting a maximum pixel value and a minimum pixel value out of said specific pixel values and
- (obtaining) residual pixel values by excluding said maximum pixel value and said minimum pixel value from said specific pixel values

However, Kahara teaches/suggests excluding the maximum and the minimum values before applying averaging. [English abstract, Purpose, lines 1-4; Fig. 1, ref. 31.]

Kim and Kahara are combinable because they have aspects that are from the same field of endeavor of signal filtering.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Kim with the teaching of Kahara by excluding the maximum and the minimum values before applying averaging. The motivation would have been to eliminate noise contained in data, as Kahara indicates in line 1 of the abstract.

Therefore, it would have been obvious to combine Kahara with Kim to obtain the invention as specified in claim 21.

35. Regarding claim 22, Kim further discloses

- extracting said peripheral pixels, to be employed for a calculation, out of a plurality of discontinuous pixels, wherein distance intervals for extracting said peripheral pixels are unequal relative each other [Fig. 2, (b)-(e); Col. 5, lines 31-43. Note that the peripheral pixels surrounding the noticed pixel (r) are discontinuous and the distance intervals are different (e.g., for (b) the intervals to the left, to the right, above and below pixel r are 1, 1, 2 and 3, respectively)]

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36. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Geiger et al. (US 5,268,751) and Ukita (JP 63-178674, with English abstract) as applied to claim 16, and further in view of Kim (US 6,594,400).

Regarding claim 23, the combined invention of Geiger and Ukita discloses all limitations of its parent, claim 16.

The combined invention of Geiger and Ukita does not expressly disclose

said second spatial-filtering processing further comprises the steps of:

- finding sum-of-product values between noticed pixels and peripheral pixels
- establishing said sum-of-product values as values as values of said noticed pixels
- extracting said peripheral pixels, to be employed for a calculation, out of a plurality of discontinuous pixels, wherein distance intervals for extracting said peripheral pixels are unequal relative to each other

However, Kim teaches/suggests a filtering process that selects peripheral pixels from discontinuous pixels from uneven distance intervals to calculate sum-of-product values to be used as the values of the noticed pixels. [Fig. 1, ref. 105; Col. 4, lines 14-19; Col. 6, lines 23-28. Fig. 2, (b)-(e); Col. 5, lines 31-43. See the analyses of claims 21 and 22. ]

The combined invention of Geiger and Ukita is combinable with Kim because they have aspects that are from the same field of endeavor of signal filtering.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Geiger and Ukita with the teaching of Kim by applying a (second) filtering process that selects peripheral pixels from discontinuous pixels from uneven distance intervals to calculate sum-of-product values to be used as the values of the noticed pixels. The motivation would have been remove noise (such

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as the block and ring effects) while maintaining the details of an image, as Kim indicates in Col. 2, lines 45-46 and Col. 3, lines 47-56.

Therefore, it would have been obvious to combine Kim with Geiger and Ukita to obtain the invention as specified in claim 23.

***Allowable Subject Matter***

37. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

38. Claims 19 and 20 are allowed.

39. The following is a statement of reasons for the indication of allowable subject matter:

40. Regarding claim 3, closest art of record Ward et al. (US 5,585,859) and Peli (US 6,611,618) together discloses an image-processing method that performs multiple, different spatial filtering processes with each operating with a predetermined limit. [See the analyses for claims 1 and 2.] Additionally, per the analysis of claim 16, Geiger et al. (US 5,268,751) and Ukita (JP 63-178674, with English abstract) teaches that the first

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spatial filter has a higher frequency band. However, none of the references teaches or suggests that the upper limit used with the first filter is greater than that of the second filter.

41. Regarding claim 19, and similarly claim 20, closest art of record Malkin et al. (US 6,614,474) discloses a imaging system that sharpens an image after it has been scaled, with the degree of sharpness being user-provided [Fig. 1, refs. 200, 300, 400] and Chan (US 6,665,447) further teaches sharpening followed by scaling [Fig. 2, refs. 32 and 34]. However, neither teaches subjecting the order of performing the two kinds of filtering processes to the degree of the desired sharpness.

### ***Contact Information***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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